

CHARLES E. MILLER
PRINCIPAL INVESTIGATOR,
CARBON IN ARCTIC RESERVOIRS VULNERABILITY EXPERIMENT
(CARVE)

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Education

Ph.D., Physical Chemistry, University of California, Berkeley (1991)
B.S., Chemistry and History, Duke University, *cum laude and departmental prize in Chemistry* (1986)

Areas of Expertise

Carbon Cycle Science, Arctic-Boreal Systems, Greenhouse Gas Emissions, Megacity Emissions and Remote Sensing, Atmospheric Chemistry and Photochemistry, Molecular Spectroscopy

Professional Experience

Jet Propulsion Laboratory (2003 – present)
Principal Investigator, Carbon in Arctic Reservoirs Vulnerability Experiment (2010 – present)
Deputy Project Scientist, OCO-2 (2010)
Deputy Principal Investigator, Orbiting Carbon Observatory (2001–2009)
Science Element Manager, Orbiting Carbon Observatory (2003–2009)
Supervisor, Orbiting Carbon Observatory Science Group (2005–2008)
Principal Scientist (2010 – present)
Project Scientist (2005 – present)
Research Scientist (2003–2005)
Visiting Associate in Environmental Science & Engineering, Division of Geological and Planetary Sciences, California Institute of Technology (2012 – present)
Assistant Professor, Department of Chemistry, Haverford College (1997–2003)
National Research Council Resident Research Associate, NASA Jet Propulsion Laboratory (1994–1997)
Welch Postdoctoral Fellow, Rice University (1991–1994)

Current Projects

NASA Earth Systems Science Pathfinder (ESSP)/Ventures (EV-S1): *Carbon in Arctic Reservoirs Vulnerability Experiment (CARVE)*, Principal Investigator
NASA Terrestrial Ecology Program: *CARVE Airborne Observations of Carbon Dynamics in the Vulnerable Arctic-Boreal Ecosystems of Northwestern Canada – CARVE-CAN*, Principal Investigator
NASA Interdisciplinary Science Program (IDS): *Permafrost Vulnerability in a Seasonally Sea Ice-free Arctic*, Principal Investigator
NASA Rapid Response Program (RRNES): *Quantifying Methane Emissions in the San Joaquin Valley*, Principal Investigator
Keck Institute for Space Studies (KISS): *Space-based Strategies to Monitor Megacity Greenhouse Gas Emissions*, JPL Principal Investigator
JPL RTD: *High-resolution Regional-scale Greenhouse Gas Flux Estimation*, Principal Investigator
NIST: *Megacity Carbon Project*, Lead Scientist
NASA Carbon Cycle Science Program: *Quantification and Attribution of Greenhouse Gas Emissions from the Los Angeles Megacity*, Co-I
NASA: *The Orbiting Carbon Observatory (OCO-2) Mission*, Science Team member
Keck Institute for Space Studies (KISS): *Methane on Mars*, Participant

NASA Atmosphere Composition Program: *Laboratory Spectroscopy in Support of Atmospheric Composition Research*, Co-I

Select Past Projects

NASA Terrestrial Ecology Program: *Arctic Boreal Vulnerability Experiment (ABoVE)*, Science Definition Team member

JPL DRDF: *Creating a High-resolution Greenhouse Gas Emissions Inventory for the LA Megacity*, Co-I

Keck Institute for Space Studies: *Quantifying Sources and Sinks of CO₂*, Co-lead

GOSAT Research Announcement: *Validation of GOSAT Data Using OCO Methods and Algorithms*, Co-I

DOE Atmospheric Radiation & Monitoring Program: *OCO FTS Validation Intensive Operation Period*, PI

NASA Advanced Information Systems Technology: *Geostatistical Data Fusion for Remote Sensing Applications*, Co-I

NASA Earth Science: *Atmospheric CO₂ Observations from Space (ACOS)*, Deputy Project Scientist

NASA Atmospheric Composition/Tropospheric Chemistry: *Improving Atmospheric CO₂ Retrievals*, PI

NASA Earth Systems Science Pathfinder (ESSP): *The Orbiting Carbon Observatory (OCO) Mission*, Deputy PI (2001-2009); OCO-2 Deputy Project Scientist (2010)

NASA Atmospheric Composition Program: *Remaining Challenges for Atmospheric Chemistry: Quantifying Measurement Requirements for Remote Sensing*, Co-I

NASA Advanced Information Systems Technology Program: *Sensor Web Operation Explorer (SOX)*, Co-I

NASA Upper Atmosphere Research Program: *Spectroscopy in Support of Upper Atmospheric Research*, Co-I

NASA Instrument Incubator Program: *Development and Evaluation of a 2-micron Differential Absorption Lidar for Profiling CO₂*, Co-I

NOAA Requirements, Planning and System Integration Program: *EDR Verification from L1*, PI

JPL DRDF FY2010: *Developing a Prototype Megacity Greenhouse Gas Monitoring Network*, PI

JPL DRDF FY2008: *Defining Science Measurement Requirements for Atmospheric Methane*, PI

JPL DRDF/SURP FY2007: *Characterization of spatio-temporal covariance of remote sensing data from earth-observing satellites*, PI

JPL RTD FY2006: *Defining Science & Instrument Requirements for MEO/GEO/L1 Earth Observations*, PI

JPL EIC FY2006: *Laboratory Spectroscopy to Enable 21st Century NASA Missions*, PI

JPL RTD FY2005: *Exploiting the Lagrange Points L1, L2, and the Moon for Earth Observation*, PI

Awards

NASA Group Achievement Award: *CARVE Team*, 2014

NASA Group Achievement Award: *Molecular Spectroscopy Team*, 2006

NASA/ASEE Summer Faculty Fellowship, 1998

Camille and Henry Dreyfus Teacher/Scholar, 1997

National Research Council Associateship, NASA Jet Propulsion Laboratory, 1994-97

Department of Energy Global Change Distinguished Postdoctoral Fellowship, Los Alamos National Laboratory, 1994 (declined)

Robert A. Welch Postdoctoral Fellowship, Rice University, 1991-1994

Regents Fellowship, University of California, Berkeley 1986-1987

Department of Chemistry Award, Duke University, 1986

NSF Nuclear Chemistry Summer School, 1985

National Lead Industries Scholar, Duke University, 1984-1986

Phi Lambda Upsilon Chemistry Honor Society, 1984-1986

Professional Activities

WMO CO₂ Experts Science Advisory Group (2009 –)

US Carbon Cycle Science Steering Group (2008 – 2014)

Contributing author, A US Carbon Cycle Science Plan 2010-2020 (2008 – 2011)

ASCENDS Science Steering Committee co-chair (2008 – 2010)

Organizer: 6th International Workshop on Greenhouse Gas Measurements from Space, Kyoto, Japan, January 2010; 5th International Workshop on Greenhouse Gas Measurements from Space, California Institute of Technology, Pasadena, CA, June 2008; Organizing Committee: 4th International Workshop on Greenhouse Gas Measurements from Space, CNES Headquarters, Paris, France, June 2007; Organizer: 2nd International Workshop on Greenhouse Gas Measurements from Space, California Institute of Technology, Pasadena, CA, March 2005
 Atmospheric Radiation & Monitoring (ARM) ACRF Review Panel member (2007)
 Department of Energy Climate Change Science Program Review Panel (2007, 2010)
 Expert Reviewer, Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Review (2005-6)
 Contributing Author: North America Carbon Program Plan (2002)
 Contributor: NASA Carbon Cycle Roadmap 2002 – 2012 definition, 2002 – 2004
 Organizer: Atmospheric Chemistry Symposium, ACS National Meeting, March 2000, San Francisco, CA
 EPA Tropospheric Ozone Review Panel, 1995 - 1999
 Member: American Geophysical Union; American Physical Society; American Chemical Society

Publications (more than 120 total)

- Resolving the US fugitive methane emissions challenge, R Duren and **C. E. Miller**, in preparation for *Nature Climate Change*
 Global, geospatially resolved CO₂ flux constraints for reported anthropogenic emissions, R. Duren and **C.E. Miller**, to be submitted to *Bulletin of the American Meteorological Society*.
 Satellite Constellation Observing Strategies for Improved Geospatially Resolved CO₂ Flux Estimates, **C.E. Miller** and D.F. Baker, in preparation for *J. Geophys. Res.*
 Satellite Detection of Enhanced Pre-Eruptive CO₂ Emissions, FM Schwandner, HM. Nguyen, C Frankenberg, F Kataoka, A Kuze, K Shiomi, CR. Sealing, SA. Carn, N Goto, H Suto, T Takeda, S Kanekon, Y Yoshida, M Ajiro, **C. E. Miller**, in preparation for *Science*
 Terahertz spectroscopy of HD18O, S. Yu, J.C. Pearson, B.J. Drouin, **C. E. Miller**, submitted to *J. Chem. Phys.*
 Statistical bias and variance for the regularized inverse problem: Application to space-based atmospheric CO₂ retrievals, N. Cressie, R. Wang, M Smyth, **CE Miller**, accepted *J. Geophys. Res.*
 FT-IR spectra of ¹³C- and ¹⁸O-enriched CO₂ in the v₃ region: Highly accuracy frequency calibration and spectroscopic constants for ¹⁶O¹²C¹⁸O, ¹⁸O¹²C¹⁸O and ¹⁶O¹³C¹⁶O. Ben M. Elliott, Keeyoon Sung, and **Charles E. Miller**. In press *J. Mol. Spectrosc.*
 Observing terrestrial ecosystems and the carbon cycle from space, David Schimel, Ryan Pavlick, Joshua B. Fisher, Greg Asner, Sassan Saatchi, **Charles Miller**, Christian Frankenberg, Kathy Hibbard, Peter Cox. Accepted for *Global Change Biology*.
 High Resolution Spectral Analysis of Oxygen IV. Dunham potentials for the X³Σ_g⁻, a¹Δ_g, and b¹Σ_g⁺ states, S. Yu, **C. E. Miller**, B.J. Drouin, H.S.P. Müller, accepted for *J. Chem. Phys.*
 Atmospheric transport simulations in support of the Carbon in Arctic Reservoirs Vulnerability Experiment (CARVE), Henderson, J. M., Eluszkiewicz, J., Mountain, M. E., Nehrkorn, T., Chang, R. Y.-W., Karion, A., Miller, J. B., Sweeney, C., Steiner, N., Wofsy, S. C., and **Miller, C. E.**: Atmos. Chem. Phys. Discuss., 14, 27263-27334, [doi:10.5194/acpd-14-27263-2014](https://doi.org/10.5194/acpd-14-27263-2014), 2014.
 Estimated methane emissions from Alaska in 2012 from CARVE airborne observations. Rachel Chang, **Charles E. Miller**, Steven J. Dinardo, Anna Karion, Colm Sweeney, Lori M. Bruhwiler, John M. Henderson, Marikate E. Mountain, Bruce C. Daube, John B. Miller, Steven C. Wofsy. *Proceedings of the National Academy of Sciences. Adv. Online* [doi:10.1073/pnas.1412953111](https://doi.org/10.1073/pnas.1412953111)
 Mapping CH₄:CO₂ ratio in Los Angeles with Simulated Satellite Remote Sensing from Mount Wilson. Kam Weng Wong, Dejian Fu, Thomas Pongetti, Sally Newman, Eric Kort, Riley Duren, Ying Hsu, **Charles Miller**, Yuk L. Yung, Stanley P. Sander. *Atmos. Chem. Phys. Discuss.*, 14, 17037-17066, 2014. [doi:10.5194/acpd-14-17037-2014](https://doi.org/10.5194/acpd-14-17037-2014)
 FT-IR spectra of ¹⁷O-enriched CO₂ in the v₃ region: Highly accuracy frequency calibration and spectroscopic constants for ¹⁶O¹²C¹⁷O, ¹⁷O¹²C¹⁷O and ¹⁷O¹²C¹⁸O. Ben M. Elliott, Keeyoon Sung, and **Charles E. Miller**. *J. Mol. Spectrosc.* 304, 1 (2014). DOI: [10.1016/j.jms.2014.08.001](https://doi.org/10.1016/j.jms.2014.08.001)
 Carbon cycle uncertainty in the Alaskan Arctic, J.B. Fisher, M. Sikka, W.C. Oechel, C.D. Koven, D.N. Huntzinger, A. Ahlström, A.M. Arain, I. Baker, J.M. Chen, P. Ciais, C. Davidson, M. Dietze, B. El-Masri, D. Hayes, C. Huntingford, A. Jain, M.R. Lomas, B. Poulter, D. Price, A.K. Sahoo, K. Schaefer,

- H. Tian, E. Tomelleri, H. Verbeeck, N. Viovy, N. Zeng, **C.E. Miller**, *Biogeosciences* 11, 4271-4288, 2014. [doi:10.5194/bg-11-4271-2014](https://doi.org/10.5194/bg-11-4271-2014)
- High Resolution Spectral Analysis of Oxygen III. Laboratory measurements of the $b^1\Sigma_g^+ - X^3\Sigma_g^-$ airglow bands, B.J. Drouin, S. Yu, B. Elliott, T.J. Crawford, **C.E. Miller**, *J. Chem. Phys.* **139**, 144301 (2013). [doi: 10.1063/1.4821759](https://doi.org/10.1063/1.4821759)
- Current systematic carbon cycle observations and needs for implementing a policy-relevant carbon observing system, Ciais, P., Dolman, A. J., Bombelli, A., Duren, R., Peregon, A., Rayner, P. J., **Miller, C.**, Gobron, N., Kinderman, G., Marland, G., Gruber, N., Chevallier, F., Andres, R. J., Balsamo, G., Bopp, L., Bréon, F.-M., Broquet, G., Dargaville, R., Battin, T. J., Borges, A., Bovensmann, H., Buchwitz, M., Butler, J., Canadell, J. G., Cook, R. B., DeFries, R., Engelen, R., Gurney, K. R., Heinze, C., Heimann, M., Held, A., Henry, M., Law, B., Luyssaert, S., Miller, J., Moriyama, T., Moulin, C., Myneni, R. B., Nussli, C., Obersteiner, M., Ojima, D., Pan, Y., Paris, J.-D., Piao, S. L., Poulter, B., Plummer, S., Quegan, S., Raymond, P., Reichstein, M., Rivier, L., Sabine, C., Schimel, D., Tarasova, O., Valentini, R., van der Werf, G., Wickland, D., Williams, M., and Zehner, C. *Biogeosciences Discuss.*, 10, 11447-11581, [doi:10.5194/bgd-10-11447-2013](https://doi.org/10.5194/bgd-10-11447-2013), 2013.
- Absolute $^{12}\text{C}^{16}\text{O}_2$ transition frequencies at the kHz-level from 1.6 to 7.8 μm , DA Long, GW Truong, JT Hodges, **CE Miller**, *JQSRT*, Online 10 July 2013. <http://dx.doi.org/10.1016/j.jqsrt.2013.07.001>
- Diurnal tracking of anthropogenic CO₂ emissions in the Los Angeles Megacity during spring 2010, S Newman, S. Jeong, M.L. Fischer, X. Xu, C.L. Haman, B. Lefer, S. Alvarez, B. Rappenglück, E.A. Kort, A.E. Andrews, J. Peischl, K.R. Gurney, **C.E. Miller**, Y.L. Yung, *Atmos. Chem. Phys.*, **13**, 4359-4372, 2013. [doi:10.5194/acp-13-4359-2013](https://doi.org/10.5194/acp-13-4359-2013)
- Effects of atmospheric light scattering on spectroscopic observations of greenhouse gases from space. Part 2: Algorithm intercomparison in the GOSAT data processing for CO₂ retrievals over TCCON sites, Oshchepkov, S., et al., *J. Geophys. Res. Atmos.*, 118, (2013) [doi:10.1002/jgrd.50146](https://doi.org/10.1002/jgrd.50146).
- Surface observations for monitoring urban fossil fuel CO₂ emissions: minimum site location requirements for the Los Angeles megacity, E.A. Kort, W. Angevine, R. Duren and **C. E. Miller**, *J. Geophys. Res.* **118**, 1577-1584 (2013). [DOI: 10.1002/jgrd.50135](https://doi.org/10.1002/jgrd.50135)
- Atmospheric validation of high accuracy CO₂ absorption coefficients for the OCO-2 mission, D.R. Thompson, DC Benner, LR Brown, D Crisp, V Malathy Devi, Y Jiang, V Natraj, F Oyafuso, K Sung, D Wunch, R Castano, **CE Miller**, *JQSRT* **113**, 2265-2276 (2012).
- CARVE-FTS observations of Arctic CO₂, CH₄ and CO. Overview of the instrument, F. Dupont, F. Tanguay, M. Li, G. Perron, **C.E. Miller**, S.J. Dinardo, T.P. Kurosu, *SPIE Remote Sensing* **8532**, 853204 (2012). [doi:10.1117/12.979826](https://doi.org/10.1117/12.979826)
- Space-based Observations of Megacity Carbon Dioxide, E.A. Kort, C. Frankenberg, **C.E. Miller**, T. Oda, *Geophys Res Lett* **39**, L17806 (2012). [doi:10.1029/2012GL052738](https://doi.org/10.1029/2012GL052738)
- Vertically Constrained CO₂ Retrievals from TCCON Measurements, L. Kuai, B.J. Connor, D. Wunch, R.-L. Shia, **C.E. Miller**, Y.L. Yung, *JQSRT* **113**, 1753-1761 (2012). <http://dx.doi.org/10.1016/j.jqsrt.2012.04.024>
- Measuring the Carbon Emissions of Megacities, R. Duren and **C. E. Miller**, *Nature Climate Change* **2**, 560-562 (2012). [doi:10.1038/nclimate1629](https://doi.org/10.1038/nclimate1629).
- High Resolution Spectral Analysis of Oxygen II. Rotational spectra of $a^1\Delta_g$ O₂ isotopologues, B.J. Drouin, H. Gupta, S. Yu, **C. E. Miller**, H.S.P. Müller, *J. Chem. Phys.* **137**, 024305 (2012). <http://dx.doi.org/10.1063/1.4719169>
- High Resolution Spectral Analysis of Oxygen I. Isotopically Invariant Dunham Fits for the $X^3\Sigma_g^-$, $a^1\Lambda_g$, and $b^1\Sigma_g^+$ States, S. Yu, **C. E. Miller**, B.J. Drouin, H.S.P. Müller, *J. Chem. Phys.* **137**, 024304 (2012). <http://dx.doi.org/10.1063/1.4719170>
- Frequency-stabilized cavity ring-down spectroscopy (Frontiers Article), D. A. Long, A. Cygan, R. D. van Zee, M. Okumura, **C. E. Miller**, D. Lisak, J. T. Hodges, *Chem. Phys. Lett.* **536**, 1-8 (2012). <http://dx.doi.org/10.1016/j.cplett.2012.03.035>
- Fourier Transform Spectrometer Remote Sensing of O₂ A-band Electric Quadrupole Transitions, **C.E. Miller** and D. Wunch, *JQSRT* **113**, 1043-1050 (2012). [doi:10.1016/j.jqsrt.2012.01.002](https://doi.org/10.1016/j.jqsrt.2012.01.002)
- The ACOS CO₂ retrieval algorithm – Part 2: Global X_{CO_2} data characterization, D. Crisp, B.M. Fisher, C. W. O'Dell, C. Frankenberg, R. Basilio, H. Bösch, L.R. Brown, R. Castano, B. Connor, N.M. Deutscher, A. Eldering, D. Griffith, M. Gunson, A. Kuze, L. Mandrake, J. McDuffie, J. Messerschmidt, **C. E. Miller**, I. Morino, V. Natraj, J. Notholt, D. O'Brien, F. Oyafuso, I. Polonsky, J.

- Robinson, R. Salawitch, V. Sherlock, M. Smyth, H. Suto, T. Taylor, D.R. Thompson, P. O. Wennberg, D. Wunch, Y.L. Yung, *Atmos. Meas. Tech. Discuss.*, **5**, 1-60, 2012. [doi:10.5194/amtd-5-1-2012](https://doi.org/10.5194/amtd-5-1-2012).
- The ACOS CO₂ retrieval algorithm – Part 1: Description and validation against synthetic observations, C. W. O'Dell, B. Connor, H. Bösch, D. O'Brien, C. Frankenberg, R. Castano, M. Christi, D. Crisp, A. Eldering, B. Fisher, M. Gunson, J. McDuffie, **C.E. Miller**, V. Natraj, F. Oyafuso, I. Polonsky, M. Smyth, T. Taylor, G. C. Toon, P. O. Wennberg, D. Wunch, *Atmos. Meas. Tech.*, **5**, 99-121, 2012. [doi:10.5194/amt-5-99-2012](https://doi.org/10.5194/amt-5-99-2012)
- CARVE: The Carbon in Arctic Reservoirs Vulnerability Experiment **C.E. Miller**, S.J. Dinardo, and the CARVE Science Team, *IEEE Aerospace Conf* (2012).
- A method for evaluating bias in global measurements of CO₂ total columns from space, D. Wunch, P. O. Wennberg, G. C. Toon, B. J. Connor, B. Fisher, G. B. Osterman, C. Frankenberg, L. Mandrake, C. O'Dell, P. Ahonen, S. C. Biraud, R. Castano, N. Cressie, D. Crisp, N. M. Deutscher, A. Eldering, M.L. Fisher, D.W.T. Griffith, M. Gunson, P. Heikkinen, G. Keppel-Aleks, E. Kyrö, R. Lindenmaier, R. Macatangay, J. Mendonca, J. Messerschmidt, **C.E. Miller**, I. Morino, J. Notholt, F. A. Oyafuso, M. Rettinger, J. Robinson, C. M. Roehl, R. J. Salawitch, V. Sherlock, K. Strong, R. Sussmann, T. Tanaka, D. R. Thompson, O. Uchino, T. Warneke, and S.C. Wofsy, *Atmos. Chem. Phys.*, **11**, 12317-12337, 2011. [doi:10.5194/acp-11-12317-2011](https://doi.org/10.5194/acp-11-12317-2011)
- The air-broadened, near-infrared CO₂ line shape in the spectrally isolated regime: Evidence of simultaneous Dicke narrowing and speed-dependence, D. A. Long, K. Bielska, D. Lisak, D. K. Havey, M. Okumura, **C.E. Miller**, J. T. Hodges, *J. Chem. Phys.* **135**, 064308 (2011). [doi:10.1063/1.3624527](https://doi.org/10.1063/1.3624527)
- O₂ A-band line parameters to support atmospheric remote sensing. Part II: The rare isotopologues, D.A. Long, D.K. Havey, M. Okumura, **C.E. Miller**, J.T. Hodges, *JQSRT* **112**, 2527-2541 (2011). [doi:10.1016/j.jqsrt.2011.07.002](https://doi.org/10.1016/j.jqsrt.2011.07.002)
- The 2009 edition of the GEISA spectroscopic database, N. Jacquinot-Husson *et al.*, *JQSRT* **112**, 2395-2445 (2011). [doi:10.1016/j.jqsrt.2011.06.004](https://doi.org/10.1016/j.jqsrt.2011.06.004)
- Frequency-stabilized cavity ring-down spectroscopy of carbon dioxide isotopic ratios, D.A. Long, M. Okumura, **C.E. Miller**, J.T. Hodges, *Appl. Phys. B* **105**, 471-477 (2011). [DOI: 10.1007/s00340-011-4518-z](https://doi.org/10.1007/s00340-011-4518-z).
- Towards Robust, Global Greenhouse Gas Monitoring, R.M. Duren, **C.E. Miller**, *Greenhouse Gas Measurement & Management* **1**, 80-84 (2011). [DOI:10.1080/20430779.2011.579356](https://doi.org/10.1080/20430779.2011.579356)
- Global Characterization of CO₂ Column Retrievals from Shortwave-Infrared Satellite Observations of the Orbiting Carbon Observatory-2 Mission, H. Boesch, D. Baker, B. Connor, D. Crisp, **C.E. Miller**, *Remote Sens.* **3**, 270-304 (2011). [doi:10.3390/rs3020270](https://doi.org/10.3390/rs3020270)
- Pre-flight spectral calibration of the Orbiting Carbon Observatory, J.O. Day, C.W. O'Dell, H.R. Pollock, C.J. Bruegge, D.M. Rider, D. Crisp, **C.E. Miller**, *IEEE Trans. Geosci. Remote Sens.* **99**, 1-9 (2011). [doi:10.1109/TGRS.2011.2107745](https://doi.org/10.1109/TGRS.2011.2107745)
- Proposed Investigations from NASA's Earth Venture-1 (EV-1) Airborne Science Selections, B.D. Allen, S.A. Braun, J.H. Crawford, E.J. Jensen, **C.E. Miller**, M. Moghaddam, H. Maring, *2010 IEEE International Geosci. Remote Sens. Symp. (IGARSS)*, pp. 2575-2578 (2010). [doi:10.1109/IGARSS.2010.5651920](https://doi.org/10.1109/IGARSS.2010.5651920)
- Pre-flight radiometric calibration of the Orbiting Carbon Observatory, C.W. O'Dell, J.O. Day, H.R. Pollock, C.J. Bruegge, D.M. O'Brien, R. Castano, I. Tkacheva, **C.E. Miller**, D. Crisp, *IEEE Trans. Geosci. Remote Sens.* **49**, 2438 (2010). [doi:10.1109/TGRS.2010.2090887](https://doi.org/10.1109/TGRS.2010.2090887)
- Lorentz half-width, pressure-induced shift and speed-dependent coefficients in oxygen-broadened CO₂ bands at 6227 & 6348 cm⁻¹ using a constrained multispectrum analysis, V. Malathy Devi, D.C. Benner, **C.E. Miller**, A. Predoi-Cross, *JQSRT* **111**, 2355 (2010). [doi:10.1016/j.jqsrt.2010.06.003](https://doi.org/10.1016/j.jqsrt.2010.06.003)
- A Geostatistical Data Fusion Technique for Merging Remote Sensing and Ground-based Observations of Aerosol Optical Thickness, A. Chatterjee, A.M. Michalak, R.A. Kahn, S.R. Paradise, A.J. Braverman, **C.E. Miller**, *J. Geophys. Res.* **115**, D20207 (2010). [doi:10.1029/2009JD013765](https://doi.org/10.1029/2009JD013765)
- O₂ A-band line parameters to support atmospheric remote sensing, D.A. Long, D.K. Havey, M. Okumura, **C.E. Miller**, J.T. Hodges, *JQSRT* **111**, 2021 (2010). [doi:10.1016/j.jqsrt.2010.05.011](https://doi.org/10.1016/j.jqsrt.2010.05.011)
- Cavity ringdown spectroscopy measurements of sub-Doppler hyperfine structure, D.A. Long, D.K. Havey, M. Okumura, **C.E. Miller**, J.T. Hodges, *Phys. Rev. A* **81**, 064502 (2010). [doi:10.1103/PhysRevA.81.064502](https://doi.org/10.1103/PhysRevA.81.064502)
- Channel selection for CO₂ remote sensing, L. Kuai, V. Natraj, R.-L. Shia, **C.E. Miller**, Y.L. Yung, *JQSRT*

111, 1296 (2010). [doi:10.1016/j.jqsrt.2010.02.011](https://doi.org/10.1016/j.jqsrt.2010.02.011)

Terahertz spectroscopy of oxygen in its $X^3\Sigma_u^-$ and $a^1\Delta_g$ electronic states, B.J. Drouin, S. Yu, **C.E. Miller**, H.S.P. Mueller, F. Lewen, S. Brunken, H. Habara, *JQSRT* **111**, 1167 (2010). [doi:10.1016/j.jqsrt.2009.12.006](https://doi.org/10.1016/j.jqsrt.2009.12.006)

A Reusable Process Control System Framework for the Orbiting Carbon Observatory and NPP Sounder PEATE missions, C.A. Mattmann, D. Freeborn, D. Crichton, B. Foster, A. Hart, D. Woppard, S. Hardman, P. Ramirez, S. Kelly, A.Y. Chang, **C.E. Miller**, *Third International Conf. on Space Mission Challenges for Information Technology: SMC-IT 2009*, 165-172 (2009). [doi:10.1109/SMC-IT.2009.27](https://doi.org/10.1109/SMC-IT.2009.27)

Ultra-sensitive optical measurements of high- J transitions in the O_2 A-band, D.K. Havey, D.A. Long, M. Okumura, **C.E. Miller**, J.T. Hodges, *Chem. Phys. Lett.* **483**, 49 (2009). [doi:10.1016/j.cplett.2009.10.067](https://doi.org/10.1016/j.cplett.2009.10.067)

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